RENEWABLE TEXTURED COSMETIC COMPOSITIONS

BACKGROUND OF THE INVENTION

I. Field of the Invention

The present invention relates to cosmetic compositions that may be packaged in a non-aerosol container, such as a jar. More particularly, the present invention relates to cosmetic creams or emulsions having at least one volatile compound that imparts a whipped texture to at least the upper portion of the cosmetic composition. Still more particularly, the textured surface of the cosmetic composition remaining in the container renews itself after each use of the composition by the consumer. In other words, the composition is "self-foaming" or "self-whipping" such that the surface thereof becomes re-texturized during a pre-determined period of time.

II. Description of the Prior Art

Foamable cosmetic compositions may take a variety of forms including, among others, skin and hair mousses, and aerosol shave foams. These prior art foaming products rely on gasses or "propellants" to produce the desired foaming characteristics. They also require special, highly pressurized packaging systems, such as metal aerosol spray cans, and elaborate dispensing systems involving valves, gaskets, fine mesh, etc. Furthermore, these systems use gasses that have relatively low flashpoints that are, thus, quite flammable and quite hazardous.

U.S. Patent Nos. 6,210,656 and 6,033,647, assigned to L'Oreal, describe self-foaming compositions that are post foaming compositions (i.e., they foam after having been dispensed out of the container). Post-foaming compositions are packaged in pressurized aerosol containers and utilize flammable self-foaming agents such as isopentane, isobutane, and mixtures thereof. The flammability and volatility of these agents, and the pressure they build up in the container, make them impractical to be packaged in non-aerosol containers.

U.S. Patent No. 5,500,211, assigned to Gillette, describes a self-foaming composition that is a post-foaming shaving composition, where the self-foaming agents are volatile hydrocarbons having 4 to 6 carbon atoms. These self-foaming agents are highly flammable. The flammability and volatility of these agents, and the pressure they build up in the container, make packaging such compositions in non-aerosol containers quite difficult, if not impossible.

U.S. Patent No. 6,165,456, also assigned to Gillette, describes a self-foaming shaving gel comprising volatile hydrocarbons which, as discussed above, are flammable and, hence, potentially dangerous. Furthermore, such volatile hydrocarbons require the self-foaming shaving gel to be packaged in a suitable aerosol container.

U.S. Patent Nos. 5,637,318; 5,643,601; 5,667,772; and 5,885,564, assigned to Lancaster, teach the use of an oxygen laden fluorocarbon to help transport oxygen through the skin. This approach comprises mixing the fluorocarbon

of choice with oxygen in a pressurized vessel, so that the oxygen is dissolved and "loaded" into the fluorocarbon and, thus, the final compositions.

U.S. Patent No. 6,113,919, assigned to Alliance Pharmaceutical, discloses a partially fluorinated hydrocarbon having a lipophilic portion between 4 and 18 carbon atoms to help enhance the particle size stability of a fluorocarbon.

U.S. Patent No. 5,741,499, assigned to L'Oreal, describes a homogeneous solution containing specially modified fluorinated compounds and glycols. The fluorinated compounds require at least one functional group consisting of alcohol, thiol, or primary or secondary amine to associate with glycols in the formula, thus enabling a homogeneous solution. The present invention, in contrast, uses fluorocarbons, which are substantially free of alcohol, thiol, or amine functionality, and preferably contain none.

U.S. Patent No. 6,251,375, also assigned to L'Oreal, teaches the use of volatile fluorinated compounds to accelerate the drying time of make-up, nail care, and suncare compositions. However, this patent fails to provide a self-foaming composition, which is able to produce a renewable, whipped surface texture, and which can be packaged in a non-aerosol container.

U.S. Patent No. 6,224,851, also assigned to L'Oreal, teaches a process for making transfer resistant make-up or sunscreen cosmetic compositions containing particles of a

pigment or filler, by introducing at least one volatile fluorinated solvent in a sufficient amount to act as an anti-transfer agent. However, this patent fails to provide a self-foaming composition, which is able to produce a renewable, whipped surface texture, and which can be packaged in a non-aerosol container.

Also known in the art are methods to produce foamed products that require packages that dispense compositions as a foam using specialized dispensers. Although these containers are non-aerosol containers, they require that the product passes through a fine mesh as it is pump dispensed to give a foamed appearance. These mesh-foam packages work well with only very thin products, i.e., having viscosities of less than about 1000 centipoise.

In short, the prior art fails to teach the use of volatile fluorocarbons having suitable volatility (vapor pressure and/or boiling point) parameters as self-foaming agents, or their use to create a renewable, whipped surface texture to a cosmetic product packaged in a conventional jar. There is a need in the art for such a whipped/foamed product which can be packaged in a non-aerosol container, saving the cost and filling requirements of using pressurized aerosol cans/packaging, and which uses a safe, non flammable ingredient to produce the foamed/whipped texture.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a container having a cosmetic cream with a volatile compound

in which the composition self-attains a renewable, textured surface while in the container.

It is another object of the present invention to provide self-foaming compositions, which can be packaged and sold commercially in a container, such as a jar, so that after each use, the aesthetic appeal of the whipped surface texture can be self-renewed after the jar is capped for a pre-determined period of time.

It is still another object of the present invention to achieve the above desired effect without the use of a flammable foaming agent, such as a hydrocarbon gas.

It is a further object of the present invention to provide a cosmetic cream in which the self-foaming agent additionally imparts a cooling sensation to the skin when the cream is applied.

It is still a further object of the present invention to provide such a cosmetic cream in which the self-foaming action occurs at a sufficient rate that the consumer has an indication, e.g. see and hear the process occur to some degree, when they examine or apply the cream.

To accomplish the foregoing objects and advantages, the present invention, in brief summary, is a cosmetic composition that has a volatile compound, such that, while in its container, the volatile compound, and thus the composition, expands resulting in the composition having a renewable textured surface. The composition preferably is

an emulsion. Also, the composition has a viscosity from about 5,000 cps to about 500,000 cps.

DETAILED DESCRIPTION OF THE INVENTION

The present invention is a cosmetic composition having a textured surface appearance that is renewable. The composition is most preferably a cream. The cream is preferably contained in a non-aerosol container, such as, for example, a bottle, jar or non-pressurized metal container. The upper portion of the cream has a textured appearance in the container. This textured appearance is analogous to the look of foam/bubbles, and/or nooks/crannies/craters. The appearance may also be described as "foamed" or "whipped". Each time that a portion of the cream is removed from the container or the surface of the cream is disturbed or altered by, for example, a consumer's fingers or some other manual applicator, the original textured appearance of the composition in the container reappears or is renewed within a relatively short period of time, sometimes within as little as about 2 hours, typically from about 2 hours to about 24 hours, and certainly after weekly use.

In other words, when a jar of cosmetic cream is opened for the first time, it has a nicely finished, aesthetically appealing, foamy or whipped appearance. However, after the very first use, and every time thereafter that a consumer dips her fingers into the jar, the surface of the cream remains with troughs, furrows and other concavities. The present invention provides for a cosmetic composition that self-levels and self-whips/self-foams during a pre-

determined period of time, such that each subsequent time that the jar is opened, the surface appearance of the composition has renewed itself and looks like it did the very first time the jar was opened. For a product that is used daily, and renews itself within that timeframe, this effect is novel and exciting, since the surface texture will appear newly whipped each day the jar is opened.

The cosmetic composition of the present invention has a self-foaming agent, preferably a volatile compound. The self-foaming agent expands due to its tendency to volatilize and, thus, causes the composition to also expand, thereby imparting a re-textured surface appearance to the composition. This unique attribute is made possible by the addition of a volatile compound effective to cause the cosmetic composition to renew its original textured surface appearance. In other words, the volatile compound builds up sufficient pressure to re-foam/re-whip the surface of the composition, but not so much pressure that it needs to be contained in a pressurized metal container.

The composition of the present invention has a viscosity effective to permit expansion of the self-foaming agent. Prevention of this expansion would prevent the formation of the renewable textured surface when in the container, such as a jar. The viscosity of the composition should be adequate enough to maintain the whipped surface texture once it is formed, yet also thick enough so that it can be packaged in a jar without running. Preferably, the viscosity of the composition is from about 5,000 cps to about 500,000 cps, more preferably from about 10,000 cps to about 200,000 cps, even more preferably from about 20,000

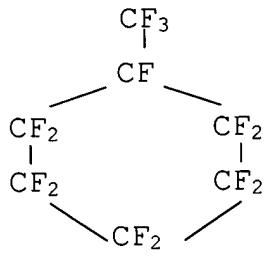
cps to about 100,000 cps, and most preferably from about 35,000 cps to about 75,000 cps.

Preferably, the volatile compound of the present invention also has a suitable latent heat of evaporation such that it produces a cooling sensation on the surface of skin when the composition is applied. Depending on the self-foaming agent chosen, this cooling sensation can be accompanied by a bubbly or fizzy sound or sensation.

Volatile compounds that are at least partially fluorinated exhibit the best chemical characteristics to facilitate the self-foaming behavior of the present invention. The greater the number of carbon-fluorine bonds in the molecule, the greater this desirable behavior. For foaming efficiency (i.e. most foaming for least amount of foaming agent needed), the best compounds for this purpose consist entirely of carbon and fluorine atoms, and thus contain only carbon-carbon and carbon-fluorine bonds. Additionally, the absence of additional functional groups minimizes any possible affinity for other components in the cosmetic composition, which could decrease the self-foaming efficiency.

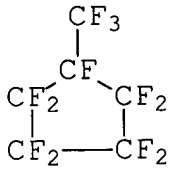
The preferred volatile compound for use in the present invention is a fluorocarbon. More preferably, the volatile compound is a perfluorocarbon, and even more preferably, a perfluoroalkylcycloalkane. Examples of perfluoroalkylcycloalkane include perfluoromethyl-cyclopentane and perfluouromethylcyclohexane. The volatile compound is most preferably perfluoromethylcyclohexane.

Perfluoromethylcyclohexane is an organic compound that has the formula:



This perfluoromethylcyclohexane is commercially available from Cosmetic Innovations Technologies S.a.r.l., and currently distributed in the US by R.I.T.A. Corporation. under the trade name Flutec PP2, or Flutec PC2.

Also preferred is the compound perfluoromethyl cyclopentane, available from the same company as above under the trade name Flutec PC1C. It has the following formula:



Also suitable for use as a volatile compound in the present invention are perfluorohexane and perfluorodimethylcyclohexane, available from the same company as above, under the tradenames Flutec PC1 and Flutec PC3, respectively. Perfluorodimethylcyclopentane (molecular weight of about 350) is also expected to be suitable in the present invention.

Also suitable for use as a volatile compound in the present invention are partially fluorinated liquids available from 3M Company under the tradenames Novec HFE 7200 (ethyl perfluorobutyl ether) and Novec HFE 7100 (methyl perfluorobutyl ether).

The perfluorocarbon compound of the present invention preferably has a boiling point from about 45 degrees C to about 110 degrees C, and more preferably from about 65 degrees C to about 85 degrees C. Related to the boiling point is the vapor pressure of the compound at room temperature (25 degrees C). The vapor pressure at room temperature is a measure of the volatility of the compound. The more viscous the composition, the higher the vapor pressure required to produce a whipped texture in the surface of the composition. Preferably, the vapor pressure at room temperature should be from about 20 mbar to about 500 mbar, more preferably from about 100 mbar to about 300 mbar. These boiling point and vapor pressure parameters apply preferably to any volatile compound used in the present invention.

The volatile compound of the present invention is present in the composition in an amount from about 0.1% percentage by weight (wt%) to about 25 wt% by total weight of the composition. More preferably, the amount of volatile compound in a present composition is from about 1% to about 15%, and most preferably from about 2.5 wt% to about 10 wt%, by total weight of the composition.

The cosmetic composition of the present invention is preferably an emulsion, more preferably an oil-in-water

emulsion. Most preferably, the composition is an oil-in-water cream. The emulsion may also be water-in-oil, water-in-silicone or a multiple emulsion. Ideally, the self-foaming agent should not totally dissolve into any phase of the emulsion, but rather when mixed into the emulsion should be present somewhat as tiny droplets of its own third phase.

Suitable cosmetic creams include, but are not limited to, a facial cream, a body cream, a facial mask, a cleansing cream, a hair conditioning crème, or a shaving cream.

The cosmetic composition of the present invention can include other suitable components, such as one or more foam-modifying agents. For example, cyclomethicones, which are miscible with fluorinated liquids, can be incorporated into the composition in order to modify the foaming characteristics. Another class of compounds that can be used to modify the foaming characteristics are higher molecular weight compounds that also contain fluorine. Accordingly, silicones that are partially fluorinated, hydrocarbons that are partially fluorinated, esters that are partially fluorinated, in fact any class of compound that is partially fluorinated, can help to dissolve the self-foaming liquid into one of the phases in the emulsion, thus influencing its foaming characteristics by decreasing the foaming behavior at room temperature. Substances such as the Fomblins, a class of perfluorinated ether polymers, are also suitable for this purpose. Also, the higher molecular weight, nonvolatile members of the Flutec series

can also be used as modifiers of the foaming characteristics of the composition.

The foam-modifying agent is preferably present in an amount from about 0.1 wt% to about 60 wt% based on the total weight of the composition. More preferably, the thickening agent is present in an amount from about 2 wt% to about 25 wt% based on the total weight of the composition.

The cosmetic compositions of the present invention may also have one or more thickening agents. The presence of, for example, a polymeric thickening agent, helps to stabilize the whipped appearance of the composition, and stabilize the uniform dispersion of the droplets of foaming agents in the composition. Also, because the density of the self-foaming agent is substantially greater than that of the composition, it has a tendency to sink to the bottom of low viscosity systems, which can have a detrimental effect on the foaming effect. Thus, the use of polymeric thickening agents and/or thickening agents capable of producing rheological "yield value" is especially useful. Useful polymeric thickening agents include, but are not limited to, polyacrylic acid polymers known as carbomers, polyacrylamide polymers such as seppigel, and other polymers based on acrylamide or acrylic acid. Also useful are cellulose and starch derivatived thickeners, and other polysaccharide derived thickeners. Examples of thickeners would be xanthan gum, carageenan, hydroxyethyl cellulose, gellan gum, hydroxypropyl methylcellulose, chitosan, hyaluronic acid, and modified starches such as those sold under the trade name Solnace. Also useful are inorganic

thickening agents. Examples of these are magnesium aluminum silicate, sodium aluminum silicate, and fumed silica.

The thickening agent is preferably present in an amount from about 0.01 wt% to about 5 wt% based on the total weight of the composition. More preferably, the thickening agent is present in an amount from about 0.5 wt% to about 2.0 wt% based on the total weight of the composition.

Also useful in the formulation are nonionic emulsifying agents. These add stability to the composition and contribute towards a uniform white appearance to the composition, which is perceived as attractive when combined with the self-whipping texture.

The cosmetic composition may also have one or more emollients, humectants, emulsifiers, preservatives, chelating agents, sunscreen agents, water proofing agents vitamins, botanical extracts, sunscreens, insect repellents, fragrances, active ingredients (such as, for example, anti-acne ingredients or skin whitening ingredients), solubilizing agents, exfoliating agents, or any combination thereof.

Useful in the manufacture of self-foaming emulsions is a homogenizer or other high shear device. These aid in the uniform dispersion of the self-foaming agent, which ideally is incorporated rapidly into the composition, and ideally processed in a vessel with a minimum of headspace. Preferably, when the composition is an emulsion, the

emulsion is prepared first and the self-foaming agent is then added to the emulsion. This would also assist in distributing the self-foaming agent throughout the composition.

The preferred embodiments of the present invention are suitable to be packaged in any number of typical cosmetic containers such as jars with caps as are commonly used in the industry, such that the cap effectively seals the composition against any escape of pressure built up in the container. The embodiments that use the most volatile self-foaming agents are preferably packaged in a container having a cap that maintains a very airtight and robust seal, such that the foaming composition does not leak out under high temperature conditions.

As the cosmetic composition is used by a consumer, the headspace in the container will gradually increase over time as the amount of the cosmetic composition in the package decreases. To some extent, it will be refilled with freshly re-foamed composition but, after numerous openings, depending on the specific composition viscosity, the foaming agent used and the container, the foaming response will not disappear, but may become less vigorous. Thus, an ideal container for this type of cream would be one where the bottom is engineered to have an adjustable inner volume, such as, for example, to swivel and "dial up", as in some current containers used for stick or deodorant products. This would help minimize the headspace, so that the base can be elevated slightly after each use, to help minimize the composition going "flat".

Such a container is not necessary but would be desirable, particularly in a jar-type configuration.

The compositions of the present invention have significant aesthetic benefits. In particular, each composition has a self-renewing surface appearance that is similar to whipped cream. For example, a portion of the cream can be removed from the container, yet within a brief period of time the original textured or crater-like surface of the cream reappears in the container. This continual, renewable feature, as well as the textured appearance itself, is believed aesthetically pleasing to a consumer.

Moreover, when the container is opened, some of the foam bubbles pop, creating a bubbling or fizzy sound. This effect is aesthetically different and interesting in a cream, and it is believed that it too will be viewed as positive by the consumer.

The following are examples of the compositions of the present invention:

Example I

Compositions 1 and 2 were identically formulated, except Composition 1 (the invention) contained 2.5% Flutec PC2 and Composition 2 contained 2.5% ethanol. Flutec PC2 has a boiling point (BP) of 76 degrees C and ethanol has a boiling point of 78.5 degrees C.

The boiling points are similar, yet the behavior of these two compositions is totally diverse. Composition 1

(the invention) gives a substantial foaming effect, creating a very aesthetic whipped cream-like appearance. Composition 2 produces no foaming. This is because the ethanol molecules, although being of a similar BP to the Flutec PC2, hydrogen-bond to the aqueous phase of the composition, and dissolve completely in the composition. The OH group on ethanol can also hydrogen-bond to other polar groups of other ingredients in the composition. Also, the remainder of the ethanol molecule is hydrocarbon, and so can bond with other organic components in the system. Since the ethanol is totally solvated in this system, it behaves differently from the volatile compound of the present invention. Thus, the ethanol does not produce a foamed or whipped appearance on the surface of the composition.

	Composition 1 (Invention)	Composition 2
Ethanol	0	2.5
Perfluoromethylcyclohexane (Flutec PC2)	2.5	0
Xanthan Gum	0.5	0.5
Disodium EDTA	0.2	0.2
Dimethicone	2.0	2.0
Hyaluronic acid	0.01	0.01
Stearic acid	1.25	1.25
Magnesium aluminum silicate	0.5	0.5
Cetearyl alcohol	6.0	6.0
Cetyl ricinoleate	3.0	3.0
C12-15 alkyl benzoate	2.0	2.0
Octylmethoxycinnamate	7.5	7.5
Benzophenone-3	3.5	3.5
Butylmethoxydibenzoylmethane	2.0	2.0
Choleth-24	0.5	0.5
IR-3535	5.0	5.0
Zeolite	0.25	0.25
Propylene glycol	2.0	2.0
Pentylene glycol	2.0	2.0

Benzyl alcohol	1.0	1.0
Polysorbate 60	0.5	0.5
Steareth-20	0.25	0.25
Peg 100 stearate	0.5	0.5
Tocopheryl acetate	0.1	0.1
Fragrance	0.2	0.2
Methyl paraben	0.35	0.35
Water	qs to 100	qs to 100

Example II

Cosmetic Compositions 3 and 4 were identically formulated, except Composition 3 (the invention) contained 2.5% Flutec PC2 and Composition 4 contained 2.5% perfluorodecalin (Flutec PP5). Flutec PC2 has a boiling point of 76 degrees C and perfluorodecalin has a boiling point of 142 degrees C.

Even though both ingredients are perfluorocarbons, it was determined that only Composition 3 (the invention), containing 2.5% perfluoromethylcyclohexane, will produce an attractive whipped appearance, whereas Composition 4, containing perfluorodecalin, will not. The chemical nature of these two compounds being equal, and the cream bases being the same, the whipping/foaming is here influenced by the relative volatility of these two compounds, as illustrated by their relative boiling points.

	Composition 3 (Invention)	Composition 4
Perfluoromethylcyclohexane (Flutec PC2)	2.5	0
Perfluorodecalin (Flutec PP5)	0	2.5
Carbopol 934	0.7	0.7
Disodium EDTA	0.2	0.2

Glycerin	3.0	3.0
Cyclomethicone	10.0	10.0
Octyl methoxy cinnamate	7.5	7.5
Benzophenone-3	3.0	3.0
Butylmethoxydibenzoylmethane	2.0	2.0
Sodium hydroxide solution	0.5	0.5
Botanical extracts	2.0	2.0
Fragrance	0.3	0.3
Methyl paraben	0.3	0.3
Benzyl alcohol	1.0	1.0
PEG-100 stearate	1.25	1.25
Laureth-4	0.50	0.50
Cetyl alcohol	0.1	0.1
Water	qs to 100	qs to 100

Having thus described the present invention with particular referenced to preferred embodiments thereof, it will be apparent that various changes and modifications may be made therein without departing from the spirit and scope of the present invention as defined in the appended claims.